General

Guideline Title

VA/DoD clinical practice guideline for the diagnosis and management of hypertension in the primary care setting.

Bibliographic Source(s)

Diagnosis and Management of Hypertension Working Group. VA/DoD clinical practice guideline for the diagnosis and management of hypertension in the primary care setting. Washington (DC): Department of Veterans Affairs, Department of Defense; 2014 Oct. 135 p. [214 references]

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Veterans Administration, Department of Defense. VA/DoD clinical practice guideline for diagnosis and management of hypertension in the primary care setting. Washington (DC): Veterans Administration, Department of Defense; 2004 Aug. 99 p.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

Note from the Department of Veterans Affairs and the Department of Defense (VA/DoD) and the National Guideline Clearinghouse (NGC): The recommendations for the diagnosis and management of hypertension in the primary care setting are organized into two modules with two algorithms. The recommendations are presented below. See the original guideline document for the algorithms and evidence tables associated with selected recommendations, including strength of recommendation and supporting evidence citations.

The strength of recommendation grading (Strong for, Weak for, Strong against, Weak against) is defined at the end of the "Major Recommendations" field.

Screening, Diagnosis and Measurement of Hypertension (HTN)

Screening

1. The Work Group recommends that screening adults for elevated blood pressure occur periodically, preferably annually. (*Modified from 2004 VA/DoD Hypertension [HTN] Clinical Practice Guideline [CPG] without an updated systematic review of the evidence.*) (Strong for)
2. The Work Group suggests that screening occur at the time of routine preventive care or routine health assessment. (*Modified from 2004 VA/DoD HTN CPG without an updated systematic review of the evidence.*) (Weak for)

Diagnosis

3. The Work Group recommends the diagnosis of hypertension be determined based on at least two blood pressure readings on two separate patient visits. (*Modified from 2004 VA/DoD HTN CPG without an updated systematic review of the evidence.*) (Strong for)

Measurement Techniques

4. The Work Group recommends that blood pressure be measured with a technique recommended for the measurement of blood pressure in adults using a properly calibrated and validated sphygmomanometer. (*Modified from 2004 VA/DoD HTN CPG without an updated systematic review of the evidence.*) (Strong for)
5. For patients whose diagnosis of hypertension remains uncertain, the Work Group recommends offering home blood pressure monitoring to confirm diagnosis prior to beginning pharmacologic treatment. (Two to three times a day for seven consecutive days, disregard the first day and take the average of measurements.) (Strong for)
6. For patients whose diagnosis of hypertension remains uncertain, the Work Group suggests offering 24 hour ambulatory blood pressure monitoring as an alternative to home blood pressure monitoring to confirm diagnosis prior to beginning pharmacologic treatment. (Weak for)

Adherence to Therapy

7. The Work Group suggests offering a multi-modal approach to adherence interventions, which could include telemonitoring, multi-disciplinary group medical appointments, (e.g., shared medical appointments), case management (by pharmacists, nurses, social workers), patient and provider education, behavioral therapy, etc. (Weak for)

Lifestyle Modification

8. The Work Group recommends offering lifestyle modification interventions for patients with prehypertension or hypertension based on patient indications and preferences as well as assessment of available local resources. (*Modified from 2004 VA/DoD HTN CPG.*) (Strong for)

Weight Reduction

9. The Work Group recommends discussing healthy weight range and advising overweight or obese hypertensive patients to reduce their body mass index to below 25. (*Modified from 2004 VA/DoD HTN CPG.*) (Strong for)
10. If a normal body mass index (<25) cannot be achieved, the Work Group suggests advising patients that a weight reduction of at least 10 pounds can achieve a decrease in blood pressure. (Weak for)

Exercise/Physical Activity

11. The Work Group recommends a target for aerobic exercise of 30 to 45 minutes per session, at least four times per week. (*Modified from 2004 VA/DoD HTN CPG.*) (Strong for)
12. The Work Group suggests the use of a self-monitoring device (e.g., pedometer, mobile apps, etc.) to increase adherence to physical activity. (Weak for)

Mind-Body Therapies

13. For patients interested in complementary and alternative medicine, the Work Group suggests considering mind-body therapies such as transcendental meditation or yoga. (Weak for)
14. The Work Group suggests not offering Tai Chi for the treatment of hypertension as there is a moderate body of evidence that shows this intervention does not reduce blood pressure. (Weak against)

Dietary Modification

15. The Work Group recommends a dietitian-led Dietary Approaches to Stop Hypertension (DASH) Diet for the treatment and/or prevention of hypertension for patients with hypertension and/or interested patients with prehypertension and other cardiovascular risk factors. (*Modified from 2004 VA/DoD HTN CPG.*) (Strong for)
16. In patients with additional cardiovascular risk factors, such as dyslipidemia, the Work Group suggests considering a dietitian-led Mediterranean Diet as an alternative to the DASH Diet. (Weak for)
17. The Work Group recommends against the use of soy protein supplements for the treatment of hypertension. (Strong against)

Sodium Reduction

18. In patients with hypertension or prehypertension, the Work Group recommends that sodium intake be limited to no more than 2300 mg/day

(100 mmol/day), with referral to a dietitian or other support as appropriate. *(Modified from 2004 VA/DoD HTN CPG.)* (Strong for)

Alcohol Reduction

19. The Work Group recommends advising hypertensive and prehypertensive patients to limit alcohol intake to no more than 1 oz per day for men or 0.5 oz of alcohol per day for women. (This is approximately 2 drinks/day in men and 1 drink/day in women, where a drink is 1.5 oz 80-proof liquor, 12 oz beer, or 5 oz wine [all 14 g]). (*Modified from 2004 VA/DoD HTN CPG.*) (Strong for)

Pharmacological Therapy

Initiation of Pharmacotherapy

20. The Work Group recommends offering pharmacologic treatment for hypertensive patients 60 years and older with a systolic blood pressure ≥160 mmHg. (Strong for)
21. The Work Group suggests considering pharmacologic treatment using a shared decision-making model for hypertensive patients 60 years and older with systolic blood pressure <160 mmHg. (Weak for)
22. The Work Group suggests offering pharmacologic treatment to patients with a history of cerebrovascular disease (stroke, transient ischemic attack, or asymptomatic carotid artery disease) and a systolic blood pressure ≥140 mmHg. (Weak for)
23. The Work Group suggests pharmacologic treatment for hypertensive patients younger than 60 with a systolic blood pressure ≥160 mmHg, regardless of diastolic blood pressure. (Weak for)
24. The Work Group recommends offering pharmacologic treatment for patients 30 years and older with a diastolic blood pressure ≥90 mmHg. (Strong for)
25. The Work Group suggests offering pharmacologic treatment for patients age 18 to 29 with a diastolic blood pressure ≥90 mmHg. (Weak for)

Blood Pressure Goals

26. For patients 60 years and over, the Work Group recommends treating to a systolic blood pressure goal of <150 mmHg. (Strong for)
27. For patients below 60 years of age, the Work Group suggests treating to a systolic blood pressure goal of <150 mmHg. (Weak for)
28. The Work Group recommends treating to a diastolic blood pressure goal <90 mmHg in patients 30 years and older. (Strong for)
29. The Work Group suggests treating to a diastolic blood pressure goal <90 mmHg in patients age 18 to 29. (Weak for)
30. For patients with diabetes (all age groups), the Work Group recommends treating to a systolic blood pressure goal of <150 mmHg. (Strong for)
31. For patients with diabetes (all age groups) who tolerate antihypertensive drugs, the Work Group suggests treating to a systolic blood pressure goal of <140 mmHg. (Weak for)
32. For patients with diabetes, the Work Group recommends treating to a diastolic blood pressure goal <85 mmHg. (Strong for)

Hypertension Control and Follow-up

33. The Work Group suggests that patients be seen within one month of initiation of lifestyle or pharmacological therapy to determine adequacy of hypertension control, degree of patient adherence, and presence of adverse effects. (*Modified from 2004 VA/DoD HTN CPG without an updated systematic review of the evidence.*) (Weak for)
34. Once the patient's blood pressure is controlled, the Work Group suggests follow-up at least annually, or more frequently as indicated, depending on patient preference. *(Modified from 2004 VA/DoD HTN CPG without an updated systematic review of the evidence.)* (Weak for)

Monotherapy or Combination Therapy

35. The Work Group suggests taking into consideration the patient's baseline blood pressure and presence of comorbidities, when deciding on either monotherapy or combination therapy (two drugs) when initiating drug therapy. (*Modified from 2004 VA/DoD HTN CPG without an updated systematic review of the evidence.*) (Weak for)
36. The Work Group suggests initiating combination therapy for patients with a baseline systolic blood pressure of >20 mmHg or diastolic blood pressure of >10 mmHg above the patient's goal. (*Modified from 2004 VA/DoD HTN CPG without an updated systematic review of the evidence.*) (Weak for)

First-Line Therapy

37. The Work Group recommends the use of thiazide-type diuretics for the treatment of hypertension. (Strong for)
38. The Work Group suggests the use of thiazide-type diuretics at recommended treatment doses as first-line therapy for drug treatment of

hypertension either as monotherapy or in combination with other agents. (*Modified from 2004 VA/DoD HTN CPG.*) (Weak for)

39. To initiate treatment of hypertension with a thiazide-type diuretic, the Work Group suggests the use of chlorthalidone or indapamide over hydrochlorothiazide. (Weak for)
40. The Work Group does not suggest switching from hydrochlorothiazide to chlorthalidone or indapamide if the patient is adequately controlled on and tolerating hydrochlorothiazide. (Weak against)
41. The Work Group suggests considering a switch from hydrochlorothiazide to chlorthalidone for patients whose hypertension is inadequately controlled on 50 mg/day of hydrochlorothiazide. (Weak for)
42. The Work Group recommends a dosage of 12.5-25 mg/day of chlorthalidone, 25-50 mg/day of hydrochlorothiazide, or a dosage of 2.5 mg/day immediate-release or 1.5-2.5 mg/day sustained-release (not currently available in the US) of indapamide. (Strong for)

Alternative or Supplementary Therapies

43. The Work Group recommends using the following as alternative therapies for patients who cannot tolerate thiazide-type diuretics, as supplementary therapies for patients who do not reach their hypertensive goals, or for those starting on combination therapy:
    a. Angiotensin-converting-enzyme inhibitors (ACEIs) or angiotensin II receptor blockers (ARBs) (but not together)
    b. Long-acting dihydropyridine calcium channel blockers (CCBs)

    (*Modified from 2004 VA/DoD HTN CPG.*) (Strong for)

44. The Work Group recommends against the use of more than one of the following three drug classes together in the same patient: ACEIs, ARBs, or direct renin inhibitors. (Strong against)
45. The Work Group recommends additional therapy in refractory hypertension (for those who do not tolerate or are not adequately controlled with triple therapy [i.e., thiazide-type diuretics, ACEI or ARB, and CCBs] described in Recommendation 43) or as supplementary therapy in some clinical indications. Drug classes for consideration can include (not in priority order):
    a. Aldosterone/mineralocorticoid receptor antagonists (e.g., spironolactone, eplerenone)
    b. Other potassium-sparing diuretic (i.e., amiloride)
    c. Alpha-adrenergic blockers
    d. Beta-adrenergic blockers
    e. Non-dihydropyridine CCBs
    f. Combined alpha-beta adrenergic blockers
    g. Peripherally acting antiadrenergic agents (reserpine, pending availability)
    h. Direct acting vasodilators (e.g., hydralazine, minoxidil)
    i. Centrally acting antiadrenergic drugs (e.g., clonidine, methyldopa)

    (Strong for)

46. The Work Group recommends against the use of alpha-adrenergic blockers as monotherapy, but this class of agents may be used as supplemental therapy or if warranted by comorbid conditions (e.g., symptomatic prostatic hypertrophy). (*Modified from 2004 VA/DoD HTN CPG.*) (Strong against)

Specific Populations

47. In patients with hypertension and chronic kidney disease (reduced kidney function with albuminuria), the Work Group recommends treatment with an ACEI, or ARB for improving kidney outcomes. (*Modified from 2004 VA/DoD HTN CPG.*) (Strong for)
48. In African American patients with hypertension, the Work Group recommends against using an ACEI or ARB as monotherapy. (Strong against)
49. In African American patients with hypertension and stage 1-3 chronic kidney disease, the Work Group suggests a combination of a thiazide-type diuretic (for cardiovascular protection) with either an ACEI or ARB (for renal protection). (Weak for)

Definitions:

Quality of Evidence and Definitions*

High quality — Further research is very unlikely to change confidence in the estimate of effect.
Moderate quality — Further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate.
Low quality — Further research is very likely to have an important impact on confidence in the estimate of effect and is likely to change the estimate.
Very low quality — Any estimate of effect is very uncertain.

*Guyatt, G. H., Oxman, A. D., Vist, G. E., Kunz, R., Falck-Ytter, Y., Alonso-Coello, P., Schünemann, H. J. & the GRADE Working Group. (2008). GRADE; An emerging consensus on rating quality of evidence and strength of recommendations. *BMJ, 336*, 924-926.

Strength of Recommendations

The relative strength of the recommendation is based on a binary scale, "Strong" or "Weak." A strong recommendation indicates that the Work Group is highly confident that desirable outcomes outweigh undesirable outcomes. If the Work Group is less confident of the balance between desirable and undesirable outcomes, they present a weak recommendation.

Similarly, a recommendation for a therapy or preventive measure indicates that the desirable consequences outweigh the undesirable consequences. A recommendation against a therapy or preventive measure indicates that the undesirable consequences outweigh the desirable consequences.

Using these elements, the grade of each recommendation is presented as part of a continuum:

- Strong for (or "The Work Group recommends offering this option …")
- Weak for (or "The Work Group suggests offering this option …")
- Weak against (or "The Work Group suggests not offering this option …")
- Strong against (or "The Work Group recommends against offering this option …")

Note that weak (For or Against) recommendations may also be termed "Conditional," "Discretionary," or "Qualified." Recommendations may be conditional based upon patient values and preferences, the resources available, or the setting in which the intervention will be implemented. Recommendations may be at the discretion of the patient and clinician or they may be qualified with an explanation about the issues that would lead decisions to vary.

Clinical Algorithm(s)

The following algorithms are provided in the original guideline document:

- Screening and Diagnosis (Module A)
- Management (Module B)

Scope

Disease/Condition(s)

Hypertension and prehypertension

Other Disease/Condition(s) Addressed

- Cerebrovascular disease
- Chronic kidney disease
- Diabetes
- Dyslipidemia
- Obesity

Guideline Category

Diagnosis

Evaluation

Management

Prevention

Screening

Treatment

Clinical Specialty

Cardiology

Family Practice

Internal Medicine

Intended Users

Advanced Practice Nurses

Health Care Providers

Nurses

Physician Assistants

Physicians

Guideline Objective(s)

- To promote evidence-based management of hypertension (HTN) and thereby improve patient's clinical outcomes
- To assist primary care providers or specialists in the screening and diagnosis of HTN, determination of appropriate treatment, and delivery of individualized interventions

Target Population

Adults (men and women) who are eligible for care in the Department of Veterans Affairs (VA) and Department of Defense (DoD) healthcare delivery system, including veterans as well as deployed and non-deployed active duty service members

Note: This guideline does not provide recommendations for the management of hypertension (HTN) in pregnant women, peri-operative/inpatient adults, children or adolescents.

Interventions and Practices Considered

Screening/Evaluation/Diagnosis

1. Periodic (preferably annual) screenings for elevated high blood pressure at the time of routine preventive health care/assessment using properly calibrated and validated instruments.
2. Hypertension (HTN) diagnosis based on at least two blood pressure readings on two separate visits
3. Offering home blood pressure monitoring or 24-hour ambulatory blood pressure monitoring to confirm diagnosis

Management/Treatment

1. Use of multi-modal approach to adherence interventions (e.g., telemonitoring, multi-disciplinary group medical appointments, patient and provider education, behavioral therapy, etc.)
2. Diet and lifestyle modification
    - Weight reduction
    - Exercise/physical activity
    - Mind-body therapies such as transcendental meditation or yoga

    - Diet modification (Dietary Approaches to Stop Hypertension [DASH] diet or Mediterranean diet)
    - Sodium reduction
    - Alcohol reduction
3. Initiation of pharmacological therapy
    - Based on age and systolic/diastolic blood pressure measurements
    - Use of shared decision-making model for hypertensive patients 60 years and older with systolic blood pressure <160 mmHg
    - Establishment of blood pressure goals based on age and presence/absence of diabetes
    - Considerations for use of monotherapy or combination therapy
    - First-line pharmacologic therapy: thiazide diuretics (chlorthalidone or indapamide recommended over hydrochlorothiazide)
4. Alternative or supplementary pharmacological therapies
    - Angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs), but not together
    - Long-acting dihydropyridine calcium channel blockers (CCBs)
    - Aldosterone/mineralocorticoid receptor antagonists (e.g., spironolactone, eplerenone)
    - Other potassium-sparing diuretic (e.g., amiloride)
    - Alpha-adrenergic blockers
    - Beta-adrenergic blockers
    - Non-dihydropyridine CCBs
    - Combined alpha-beta adrenergic blockers
    - Peripherally acting antiadrenergic agents (reserpine, pending availability)
    - Direct-acting vasodilators (e.g., hydralazine, minoxidil)
    - Centrally acting antiadrenergic drugs (e.g., clonidine, methyldopa)
5. Special considerations for patients with chronic kidney disease and African-American patients
6. Follow-up to determine adequacy of HTN control, degree of patient adherence, and presence of adverse effects

Note: The following interventions were considered but not recommended:

Tai chi
Soy protein supplements
Combined use of ACEIs, ARBs, and direct renin inhibitors in the same patient
Use of alpha-adrenergic blockers as monotherapy
Use of ACEIs or ARBs as monotherapy in African-American patients

Major Outcomes Considered

- Blood pressure control
- Mortality: cardiovascular and all-cause
- Stroke: fatal and non-fatal
- Congestive heart failure
- Coronary artery disease, including myocardial infarction and revascularization during an acute coronary syndrome
- Aortic events (e.g., aneurysm rupturing)
- Left ventricular hypertrophy
- Chronic kidney disease: progression to end-stage renal disease, starting dialysis, kidney transplant, doubling of serum creatinine or reduction of glomerular filtration rate by 50%

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

The clinical practice guideline (CPG) Champions were tasked with identifying key evidence questions to guide the systematic review of the literature on hypertension (HTN). These questions, which were developed in consultation with the Lewin team, addressed clinical topics of the highest priority for the Veterans Affairs (VA) and Department of Defense (DoD) populations. The key questions follow the population, intervention, comparison, outcome, timing and setting (PICOTS) framework for evidence questions, as established by the Agency for Healthcare Research and Quality (AHRQ). Table A-1 in the original guideline document provides a brief overview of the PICOTS typology.

The Champions and evidence review team carried out several iterations of this process, each time narrowing the scope of the CPG and the literature review by prioritizing the topics of interest. Table A-2 in the original guideline document contains the final set of key questions (KQs) used to guide the systematic review for this CPG.

Conducting the Systematic Review

The methods guiding this systematic review are described below. In part, these methods follow the guidelines for conducting a systematic review set forth by AHRQ in the Methods Guide for Effectiveness and Comparative Effectiveness Reviews. The methods also follow the guidance set forth by the VA/DoD in the Guideline for Guidelines document (see the "Availability of Companion Documents" field).

The Lewin Group conducted a systematic review in support of this VA/DoD CPG. The target population considered in the systematic review was outpatient adults ages 18 years or older. The systematic review did not address pregnant women, peri-operative/inpatient adults, children or adolescent populations. The review addressed various management strategies for patients with HTN. This included assessing the benefits and harms associated with antihypertensive pharmacologic therapies as well as the blood pressure thresholds to initiate therapy and appropriate blood pressure targets. In addition to physician-directed management strategies, the review assessed the impact of non-pharmacologic therapies (e.g., weight reduction, sodium reduction, physical activity) in reducing HTN. The review also evaluated what measurement techniques are the best indicators to initiate anti-hypertensive therapy. The target audience of the systematic review and CPG are VA/DoD and other primary care physicians and specialists who treat active and inactive military personnel.

Extensive literature searches identified 19,888 potentially relevant studies. Of those, 19,093 were excluded upon title and abstract review for not meeting the inclusion and exclusion criteria. A total of 799 full-text articles were reviewed of which an additional 649 articles were excluded. Articles excluded from the evidence base for a particular key question were removed for one or more of the following reasons: the article was published before 1966, the article was not in English, the study type did not qualify, the study population was not a relevant population of interest, the intervention was not relevant, the comparator was not relevant, the outcomes examined were not relevant, the study setting was not relevant, the sample size was <100, or the study follow-up period was less than one year.

Overall, 150 publications addressed one or more of the Key Questions and comprised the evidence base for this literature review. Table A-2 in the original guideline document indicates the number of studies that addressed each of the questions. Figure A-1 in the original guideline document displays a summary of the phases of the systematic review.

Inclusion and Exclusion Criteria

To guide the collection of evidence, the team developed an initial set of inclusion and exclusion criteria that was discussed and agreed upon by the CPG Champions. While there are some overarching criteria for the review, the team also established individual sets of inclusion and exclusion criteria for each of the key questions, as necessary.

In some cases, the inclusion and exclusion criteria were influenced by recently published systematic evidence reviews or other publications. The utilization of previous publications as a starting point to address all or some of the key questions allowed the current literature search to be more efficient and effective.

Figure A-2 in the original guideline document presents the overarching criteria that were applied to the literature searches and to the review of resulting literature identified through these searches.

A "best available evidence" approach was implemented to sort the evidence for the systematic review. To be included in the systematic review, a study must be a prospective, randomized or nonrandomized (observational) controlled trial with an independent, concurrent control group. If no high quality intervention trials are available to address a particular key question, relevant observational studies were identified and included in the systematic review.

Literature Search Strategies

Detailed search logic reflecting the PICOTS of interest were developed for each key question and used to identify relevant randomized controlled trials and other study design types as needed. The literature searches were conducted using the following bibliographic and other databases: PubMed/MEDLINE, EMBASE, and the Cochrane databases, including Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane

Database of Systematic Reviews (CDSR) and Database of Abstracts of Reviews of Effects (DARE). The CPG Champions also contributed articles as part of the evidence generation step.

The literature search strategies incorporated key text terms identified from an initial review of relevant systematic reviews and primary research studies on related topics (including how they are indexed in their respective databases, e.g., use of medical subject headings [MeSH] in PubMed, EMTREE terms in EMBASE) and any terms identified by the CPG Champions or members of the evidence review team, including a clinical and research expert on the subject matter. Members of the evidence review team including a librarian, as needed, reviewed the search strategies developed to ensure comprehensiveness. Duplicates of studies were discarded during the search process so that each publication is represented only once in the resulting evidence base for each key question.

The search strategies employed combinations of free-text keywords as well as controlled vocabulary terms including (but not limited to) MeSH and EMTREE terms. Search sets were structured to address specific key questions and sub-questions. The strategies for PubMed are presented first in the original guideline document, followed by the search strategies used in EMBASE and in Cochrane, including CENTRAL, CDSR and DARE. Searches of EMBASE and Cochrane were conducted in parallel with searches in PubMed.

For PubMed, two searches strategies were constructed for each key question. The first retrieved studies that are indexed in PubMed, and the second strategy captured any relevant studies which were in the process of being indexed or had not yet been indexed.

See Appendix A in the original guideline document for more details of the literature search strategies for each key question.

Number of Source Documents

204 studies were included in the qualitative synthesis. See Figure A-1 in the original guideline document for a systematic review flow diagram.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Quality of Evidence and Definitions*

High quality — Further research is very unlikely to change confidence in the estimate of effect.
Moderate quality — Further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate.
Low quality — Further research is very likely to have an important impact on confidence in the estimate of effect and is likely to change the estimate.
Very low quality — Any estimate of effect is very uncertain.

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Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

The 2014 guideline update uses a different system to evaluate evidence than the 2004 version. This guideline uses the Grading of Recommendations Assessment, Development and Evaluation (GRADE) method for appraising the quality of a body of evidence. See the "Rating Scheme for the Strength of the Evidence" field.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

â€‹The methodology used in developing the 2014 clinical practice guideline (CPG) follows the *Guideline for Guidelines*, an internal document of the Department of Veterans Affairs (VA) and Department of Defense (DoD) Evidence-Based Practice Working Group (EBPWG) (see the "Availability of Companion Documents" field). This document provides information regarding the process of developing guidelines, including the identification and assembly of the Guideline Champions (Champions) and other subject matter experts from within the VA and DoD, known as the Work Group, and ultimately, the submission of an updated Hypertension (HTN) CPG.

The Champions and Work Group for this CPG were charged with developing evidence-based clinical practice recommendations and publishing a guideline document to be used by providers within the VA/DoD healthcare system. Specifically, the Champions for this guideline were responsible for identifying the key questions of greatest clinical relevance, importance and interest for the diagnosis and management of patients with HTN. In addition, the Champions assisted in:

1. Conducting the evidence review, including providing direction on inclusion and exclusion criteria
2. Assessing the level and quality of the evidence
3. Identifying appropriate disciplines to be included as part of the Work Group
4. Directing and coordinating the Work Group
5. Participating throughout the guideline development and review processes.

The VA Office of Quality, Safety and Value, in collaboration with the Clinical Performance Assurance Directorate, Office of Evidence-Based Practice, US Army Medical Command, the lead agency for the DoD, identified two clinical leaders as Champions for the 2014 HTN CPG.

The Lewin Team (Team), including DutyFirst Consulting, was contracted by VA and DoD to support the development of this CPG and conduct the evidence review. The Team held the first conference call in September 2013, with participation from the contracting officer's representatives (COR), leaders from the VA and DoD evidence-based guideline development program, and the Champions. During this call, the project team discussed the scope of the guideline initiative, the roles and responsibilities of the Champions, the project timeline, and the approach for developing specific research questions on which to base a systematic review about the diagnosis and management of HTN. The group also identified a list of clinical specialties and areas of expertise that are important and relevant to the diagnosis and management of HTN, from which the Work Group members were recruited. The specialties and clinical areas of interest included: Primary Care, Internal Medicine, Nursing, Pharmacy, Dietetic and Nutritional Services, Geriatrics, and Physical Therapy.

The guideline development process for the 2014 CPG consisted of the following steps:

1. Formulating evidence questions (Key Questions)
2. Conducting the systematic review
3. Convening a three and a half day face-to-face meeting with the CPG Champions and Work Group members
4. Drafting and submitting a final CPG on the management of HTN to the VA/DoD EBPWG.

Reconciling 2004 Guideline Recommendations

The HTN Guideline Work Group focused largely on developing new and updated recommendations based on the evidence review conducted for the priority areas addressed by the key questions. In addition to those new and updated recommendations, the Guideline Work Group considered the current applicability of other recommendations that were included in the previous CPG on management of HTN, published in 2004, subject to evolving practice in today's environment. Subject to Guideline Work Group consensus, recommendations that were no longer relevant to the current practice environment, or were otherwise out of scope for this CPG, were not carried forward to this CPG. Recommendations that were considered to be relevant to the current practice environment and still in scope for this CPG, and that required no substantive (i.e., entailing clinically meaningful) rewording, were carried forward in this CPG. The wording was, however, modified slightly to be best utilized in today's clinical environment and to uphold the Grading of Recommendations Assessment, Development and Evaluation (GRADE) recommendation format. For some modified recommendations, the Guideline Work Group referred to the available evidence as summarized in the body of the 2004 CPG, though not all of these were the object of a systematic evidence review for the 2004 CPG. Some modified recommendations carried forward from the 2004 HTN CPG, however, were based on an updated systematic review conducted since the 2004 HTN CPG due to the topic being a priority area addressed by the key questions. These "modified" recommendations, and whether or not an updated systematic review was conducted, are noted in the list of recommendations (see the "Major Recommendations" field).

The Guideline Work Group recognized the need to accommodate the transition in evidence rating systems from the 2004 CPG to the current CPG. In order to report the strength of all recommendations using a consistent format (i.e., the GRADE system), the Guideline Work Group converted the United States Preventive Services Task Force (USPSTF) strengths of the recommendation accompanying the carryover recommendations from the 2004 guideline to the GRADE system. As such, the Guideline Work Group considered the strength of the evidence cited for each recommendation in the 2004 CPG as well as harms and benefits, values and preferences, and other implications, where possible. In some instances, peer-reviewed literature published since the 2004 CPG was considered along with the evidence base used for that CPG. Where such newer literature was considered when converting the strength of the recommendation from the USPSTF to GRADE system, it is noted in the discussion that follows the corresponding recommendation.

The Guideline Work Group recognizes that, while there are practical reasons for incorporating findings from a previous systematic review or previous recommendations or recent peer-reviewed publications into an updated CPG, doing so does not involve an original, comprehensive systematic review and therefore may introduce bias.

Convening the Face-to-Face Meeting

In consultation with the Contracting Officer Representative, the Champions, and the Work Group, the Lewin Team convened a three and a half day face-to-face meeting of the CPG Champions and Work Group members on April 8-11, 2014. These experts were gathered to develop and draft the clinical recommendations for an update to the 2004 HTN CPG. Lewin presented findings from the evidence review of the key questions in order to facilitate and inform the process.

Under the direction of the Champions, the Work Group members were charged with interpreting the results of the evidence review, and asked to retain, revise, or reject each recommendation from the 2004 HTN CPG. The members also developed new clinical practice recommendations, not presented in the 2004 HTN CPG, based on the 2014 evidence review. The subject matter experts were divided into two smaller subgroups at this meeting.

Following the drafting of clinical practice recommendations, the Work Group assigned a grade for each recommendation based on GRADE methodology.

Grading Recommendations

This CPG uses the GRADE methodology to assess the quality of the evidence base and assign a grade for the strength for each recommendation. The GRADE system uses the following four domains to assess the strength of each recommendation:

- Balance of desirable and undesirable outcomes
- Confidence in the quality of the evidence
- Values and preferences
- Other implications, as appropriate, e.g.,:
    - Resource Use
    - Equity
    - Acceptability
    - Feasibility
    - Subgroup considerations

Refer to the original guideline document for further descriptions of each domain.

Table A-3 in the original guideline document ("Evidence to Recommendations Framework") was used by the Work Group to guide discussions on each domain.

The strength of a recommendation is defined as the extent to which one can be confident that the desirable effects of an intervention outweigh its undesirable effects and is based on the framework above, which combines the four domains. GRADE methodology does not allow for recommendations to be made based on expert opinion alone. While strong recommendations are usually based on high or moderate confidence in the estimates of effect (quality of the evidence) there may be instances where strong recommendations are warranted even when the quality of evidence is low. In these types of instances where the balance of desirable and undesirable outcomes and values and preferences played large roles in determining the strength of a recommendation, this is explained in the discussion section for the recommendation.

The GRADE of a recommendation is based on the following elements:

- Four decision domains used to determine the strength and direction

- Relative strength (Strong or Weak)
- Direction (For or Against)

See also the "Rating Scheme for the Strength of the Recommendations" field.

Drafting and Submitting the Final CPG

Following the face-to-face meeting, the Champions and Work Group members were given writing assignments for the update of specific sections of the 2004 HTN CPG that would form the narrative text for the 2014 HTN CPG. During this time, the Champions also revised the 2004 HTN algorithms and identified the content for the guideline summary and pocket card, as part of the provider toolkits that will be developed by the Office of Evidence-Based Practice, HQ MEDCOM following the publication of the 2014 HTN CPG. The algorithms will be included as part of this HTN CPG so as to provide a clear description of the flow of patient care. The final 2014 HTN CPG was submitted to the EBPWG in October 2014.

Rating Scheme for the Strength of the Recommendations

The relative strength of the recommendation is based on a binary scale, "Strong" or "Weak." A strong recommendation indicates that the Work Group is highly confident that desirable outcomes outweigh undesirable outcomes. If the Work Group is less confident of the balance between desirable and undesirable outcomes, they present a weak recommendation.

Similarly, a recommendation for a therapy or preventive measure indicates that the desirable consequences outweigh the undesirable consequences. A recommendation against a therapy or preventive measure indicates that the undesirable consequences outweigh the desirable consequences.

Using these elements, the grade of each recommendation is presented as part of a continuum:

- Strong For (or "The Work Group recommends offering this option …")
- Weak For (or "The Work Group suggests offering this option …")
- Weak Against (or "The Work Group suggests not offering this option …")
- Strong Against (or "The Work Group recommends against offering this option …")

Note that weak (For or Against) recommendations may also be termed "Conditional," "Discretionary," or "Qualified." Recommendations may be conditional based upon patient values and preferences, the resources available, or the setting in which the intervention will be implemented. Recommendations may be at the discretion of the patient and clinician or they may be qualified with an explanation about the issues that would lead decisions to vary.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

A thorough explanation of the guideline validation process and public comment is provided in the Department of Veterans Affairs and the Department of Defense (VA/DoD) *Guideline for Guidelines* document (see the "Availability of Companion Documents" field).

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of evidence supporting each recommendation is not specifically stated.

Table A-2 in the original guideline documents indicates the number and type of studies that addressed each of the questions. Most of the studies were randomized controlled trials, although one systematic review with meta-analysis and seven observational studies were also included.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- Formulation of an efficient and effective assessment of the patient's condition
- Optimal use of therapy to reduce symptoms and enhance functionality
- Minimizing preventable complications and morbidity
- Use of personalized, proactive, patient-driven care

Benefits of Pharmacological Therapy

Treatment of hypertension (HTN) with drugs in clinical trials has reduced stroke incidence by 35% to 40%; myocardial infarction by 20% to 25%; and heart failure by more than 50%. While most hypertensive patients benefit from pharmacotherapy, this benefit is larger among patients who already have complications of HTN, such as target organ damage.

Potential Harms

Adverse effects and side effects of pharmacologic therapy. See Appendix E in the original guideline document for adverse effects and cautions for specific hypertensive drug therapies.

Contraindications

Contraindications

- Do not use angiotensin-converting enzyme inhibitors (ACEIs) if patient has a history of angioedema.
- Verapamil is contraindicated in patients with atrioventricular (AV) node dysfunction (2nd or 3rd degree heart block) and/or systolic heart failure (HF) and decreased left ventricular (LV) function.
- Medications which act through the renin-angiotensin system (i.e., ACEIs and angiotensin II receptor blockers [ARBs]) should be avoided during pregnancy since they can lead to renal dysgenesis, pulmonary hypoplasia, intrauterine growth restriction, or death of the fetus. Direct renin inhibitors may carry a similar risk and should also be avoided. Spironolactone and renin-angiotensin system blockers should be avoided in women of child-bearing potential due to their anti-androgenic effects during fetal development and concern for undervirilization of a male fetus. Providers should enter a discussion with women about their plans for pregnancy or birth control prior to the initiation of medications for the treatment of hypertension (HTN).
- Avoid concomitant use of ACEI with ARB or direct renin inhibitor due to increased risk of hypotension, syncope, increased K+, and changes in renal function.
- Avoid use of aldosterone/mineralocorticoid receptor antagonists if patient has hyperkalemia or severe kidney dysfunction.

Qualifying Statements

Qualifying Statements

- The Department of Veterans Affairs (VA) and the Department of Defense (DoD) guidelines are based upon the best information available at the time of publication. They are designed to provide information and assist decision-making. They are not intended to define a standard of

care and should not be construed as one. Neither should they be interpreted as prescribing an exclusive course of management.

- This clinical practice guideline (CPG) is based on a systematic review of both clinical and epidemiological evidence. Developed by a panel of multidisciplinary experts, it provides a clear explanation of the logical relationships between various care options and health outcomes while rating both the quality of the evidence and the strength of the recommendations.
- Variations in practice will inevitably and appropriately occur when clinicians take into account the needs of individual patients, available resources, and limitations unique to an institution or type of practice. Every healthcare professional making use of these guidelines is responsible for evaluating the appropriateness of applying them in the setting of any particular clinical situation.
- These guidelines are not intended to represent TRICARE policy. Further, inclusion of recommendations for specific testing and/or therapeutic interventions within these guidelines does not guarantee coverage of civilian sector care. Additional information on current TRICARE benefits may be found at www.tricare.mil or by contacting your regional TRICARE Managed Care Support Contractor.

Implementation of the Guideline

Description of Implementation Strategy

This clinical practice guideline (CPG) and algorithm are designed to be adapted by individual facilities in consideration of local needs and resources. The algorithm serves as a guide that providers can use to determine best interventions and timing of care for their patients in order to optimize quality of care and clinical outcomes.

Although this CPG represents the prevailing practice on the date of its publication, medical practice is evolving and this evolution requires continuous updating based on current published information. New technology and more research will improve patient care in the future. The CPG can assist in identifying priority areas for research and optimal allocation of resources. Future studies examining the results of CPGs may lead to the development of new practice-based evidence.

Implementation Tools

Clinical Algorithm

Patient Resources

Pocket Guide/Reference Cards

Quick Reference Guides/Physician Guides

Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Diagnosis and Management of Hypertension Working Group. VA/DoD clinical practice guideline for the diagnosis and management of hypertension in the primary care setting. Washington (DC): Department of Veterans Affairs, Department of Defense; 2014 Oct. 135 p. [214 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

1999 May (revised 2014 Oct)

Guideline Developer(s)

Department of Defense - Federal Government Agency [U.S.]

Department of Veterans Affairs - Federal Government Agency [U.S.]

Veterans Health Administration - Federal Government Agency [U.S.]

Source(s) of Funding

United States Government

Guideline Committee

The Diagnosis and Management of Hypertension Working Group

Composition of Group That Authored the Guideline

Veterans Affairs (VA) Working Group Members: William Cushman, MD* (*Co-Chair*); Dan Berlowitz, MD, MPH; Elaine Furmaga, PharmD; Sally Peterson, RN; Lillian Pinault, MS, RD, CDE*; Pedro Roldan, MD; Gale H. Rutan, MD, MPH, FACP*; Addison A. Taylor, MD, PhD, FAHA*

Department of Defense (DoD) Working Group Members: LCDR Travis Harrell, MD, FACP* (*Co-Chair*); James Abbott, MD*; Angela Allerman, PharmD, BCPS*; Corinne Devlin, MSN, RN, FNP-BC; Maria O'Dowd, RN; LCDR Bob Selvester, MD; Maj Tracy Snyder MS, RD; LCDR Mark Tschanz, DO*; LCDR Jacqueline Vanmoerkerque, DPT

The Office of Quality, Safety and Value: M. Eric Rodgers, PhD, FNP, BC; René M. Sutton, BS, HCA

Clinical Performance Assurance Directorate, US Army MEDCOM: Ernest Degenhardt, COL USA (Ret.), MSN, RN, ANP, FNP; Corinne Devlin, MSN, RN, FNP-BC

The Lewin Group: Cliff Goodman, PhD; Fran Murphy, MD; Hillary Kleiner, MPH; Christine Jones, MS, MPH; Nicolas Stetter, MD, MSCE

*Members of the core editing panel

Financial Disclosures/Conflicts of Interest

A hallmark of Department of Veterans Affairs/Department of Defense (VA/DoD) guidelines is their relative freedom from conflict of interest. Conflicts of interest faced by the VA/DoD Evidence-Based Practice Working Group (EBPWG) and the working groups that it charters to develop specific guidelines are handled based on the Veterans Health Administration (VHA) Handbook 1004.07 - Financial Relationships between VHA Health Care Professionals and Industry, which was signed October 21, 2009. All EBPWG meetings utilize the process of real-time verbal disclosure as required by VHA Handbook 1004.07 - Information for Members of VHA Decision Making and Advisory Groups.

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Veterans Administration, Department of Defense. VA/DoD clinical practice guideline for diagnosis and management of hypertension in the primary care setting. Washington (DC): Veterans Administration, Department of Defense; 2004 Aug. 99 p.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Electronic copies: Available from the Department of Veterans Affairs Web site.

Print copies: Department of Veterans Affairs, Veterans Health Administration, Office of Quality and Performance (10Q) 810 Vermont Ave. NW, Washington, DC 20420.

Availability of Companion Documents

The following are available:

- VA/DoD clinical practice guideline for the diagnosis and management of hypertension in the primary care setting. Clinician guideline summary. Washington (DC): Department of Veterans Affairs, Department of Defense; 2014. 16 p. Electronic copies: Available from the Department of Veterans Affairs (VA) Web site.
- VA/DoD clinical practice guideline for the diagnosis and management of hypertension in the primary care setting. Pocket card. Washington (DC): Department of Veterans Affairs, Department of Defense; 2014. 6 p. Electronic copies: Electronic copies: Available from the VA Web site.
- Guideline for guidelines. Washington (DC): Department of Veterans Affairs; 2013 Apr 10 Electronic copies: Available from the VA Web site.
- Putting clinical practice guidelines to work in VHA. Washington (DC): Department of Veterans Affairs. 64 p. Electronic copies: Available from the VA Web site.

In addition, evidence review methodology, an evidence table, dietary information, a chart of blood pressure thresholds to initiate pharmacologic therapy and treatment goals, and a drug dosage table are available in the appendices of the original guideline document.

Print copies: Department of Veterans Affairs, Veterans Health Administration, Office of Quality and Performance (10Q) 810 Vermont Ave. NW, Washington, DC 20420.

Patient Resources

The following is available:

- VA/DoD clinical practice guideline for the diagnosis and management of hypertension in the primary care setting. Patient summary. Washington (DC): Department of Veterans Affairs, Department of Defense; 2014. 4 p. Electronic copies: Available from the Department of Veterans Affairs Web site .

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

This summary was completed by ECRI on May 1, 2001. The information was verified by the guideline developer as of November 1, 2001. This summary was updated by ECRI on May 27, 2005 and January 16, 2015.

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